

# BURGESS-MANNING 3 way FUNCTIONAL CEILING

COMPLETELY SELF-CONTAINED

DISTRIBUTED BY

*Airtex Corporation*  
333 North Michigan Avenue  
CHICAGO 1, ILLINOIS

## The Original All-Purpose Ceiling Offering:

- Radiant Panel Heating
- Radiant Panel Cooling
- Acoustic Control

*Easy to Layout - Easy to Install - Competitive in Cost*

Copyright 1954—Burgess-Manning Company

**BURGESS-MANNING COMPANY**  
*Architectural Products Division*

5970 NORTHWEST HIGHWAY

CHICAGO 31, ILLINOIS

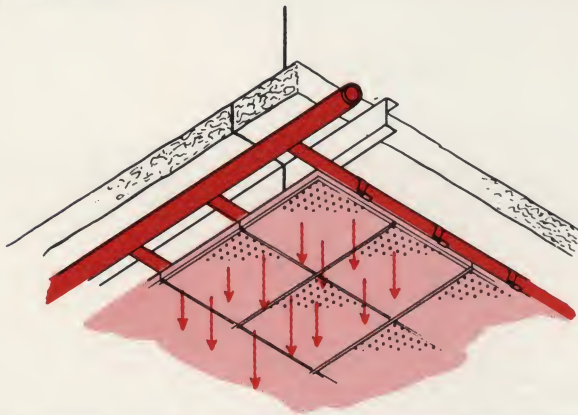


# INTRODUCTION

The three functions of the Burgess-Manning 3-Way Radiant Panel Functional Ceiling are combined for the first time to provide *uniform radiant panel heating or cooling* with ideal room acoustics for maximum human comfort. This new Functional Ceiling must not be confused with other types of systems which use an aggregation of two or more methods to achieve heating, cooling and acoustic control.

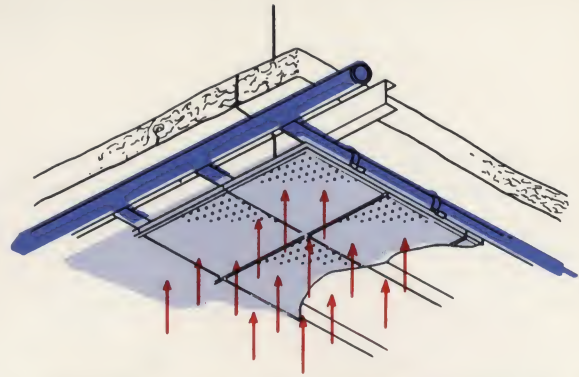
Burgess-Manning Ceiling is the simplest of all multi-function ceilings. It is completely self-contained—suspended construction—and designed for fully automatic control.

Both heating and cooling are accomplished with the same coils. The double-duty character of this component affords both design and operating simplicity, as well as being an important and desirable influence on the cost of installation.



The radiant panel principle of this most modern ceiling provides heating and cooling independently of air movement. Heat is conducted from the coils through the aluminum ceiling panels, which are secured directly to the coils. Heat energy is then radiated to or from the entire ceiling to or from every surface and object in the room. Every square inch of the Burgess-Manning Functional Ceiling works — every square inch is heated or cooled as the case may be.

The true value and outstanding advantage of this ceiling system can be best appreciated if it will be remembered that the human body is constantly generating heat, and that approximately 60% of this heat is lost by continuous radiation to surrounding, cooler objects in the room. Hence, to make a person feel warm and comfortable in the wintertime, all that is required is to raise the temperature of the surrounding surfaces to control the rate of loss of heat. This is most efficiently, economically and quickly accomplished by the radiation of heat directly to these surfaces. Similarly, for comfort in the summertime, the temperature of the surrounding room surfaces must be lowered. This is accomplished by



Burgess-Manning Functional Ceiling absorbing the heat radiated to it by warmer objects in the room.

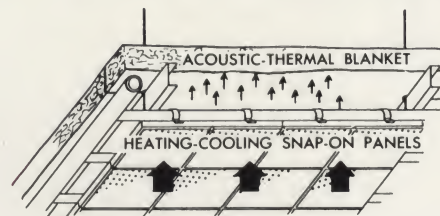
Uniform air temperatures are maintained, convection drafts and heat shadows are minimized. Concentrated heat sources and overheated air are eliminated.



The third function of the Burgess-Manning Functional Ceiling, acoustic control, is accomplished with an acoustic-thermal blanket which is placed above the heating-cooling coils. This blanket also serves as thermal insulation.

As will be featured throughout this brochure, the Burgess-Manning 3-Way Functional Ceiling is completely self-contained, requiring no ventilating system for its operation. When ventilating air is required by the Codes or for humidity control, the Burgess-Manning Functional Ceiling may be used in conjunction with any ventilating system or air diffuser; e.g., the new Modular Multi-Vent.

Likewise, the Burgess-Manning Ceiling readily accepts recessed troffers, surface mounted or hung fixtures.





**1.** Burgess-Manning Ceiling measures only 3½" from panel surface to top of suspension channel and, because of its high heat exchange capacity, the size of air conditioning ducts can be reduced by approximately 50%. Thus substantial savings in floor-to-floor height are possible and can reduce the building's cubical content by as much as 10% for the same rentable space. Similarly when remodeling existing structures, Burgess-Manning Ceiling provides a means for maintaining reasonable ceiling height.

**2.** The complete absence of radiators, convectors, baseboard radiation, under window units, etc., eliminates the cost of furring in these units. Also, the air handling equipment, fans, air mixing cabinets, etc., are substantially reduced in size. The result of these combined savings is to increase the rentable space by as much as 5%.

**3.** Burgess-Manning Ceiling with the coil filled weighs approximately 2½ lbs./sq. ft. This is about 25% of the weight of plaster ceilings and permits a substantial saving in structural steel in multi-storied buildings.

**4.** Proper selection of acoustic-thermal blankets permits balancing the thermal properties of the roof with the acoustic-thermal blanket to give the desired conditions in the intervening space. This avoids duplicating the roof insulation with the acoustic-thermal blanket.

**5.** Ventilating ducts above the Burgess-Manning Ceiling can be insulated by simply running the acoustic-thermal blanket over the ducts and inserting additional acoustic-thermal blanket under the ducts for acoustic control. This results in a substantial saving in the cost of duct installation.

**6.** The space above the suspended Burgess-Manning Ceiling offers a plenum chamber to eliminate either the supply or return air ducts.

**7.** Burgess-Manning Ceiling Panels are supplied with a baked-on white enamel finish of unusual fade-resisting and long-wearing properties. The surface can be washed repeatedly without any deterioration of the finish. Minimum of maintenance.

**8.** Burgess-Manning Ceiling can be zoned to permit wide rearrangements of movable partitions without loss to comfort conditioning.

**9.** The use of water coils in Burgess-Manning Ceiling permits complete freedom in selecting either zone or room control or a combination of both. The use of water as the heating or cooling medium permits the use of simple conventional modulating controls.

**10.** Burgess-Manning Ceiling can satisfy a wide range of heat requirements including panel demands of 125 Btu/sq. ft./hr. This high performance frequently permits the use of matching metal pan acoustic ceiling in an appreciable portion of the ceiling area in the heated space.

**11.** Burgess-Manning Ceiling has minimum thermal lag because of the inherent high heat conductivity and low mass.

**12.** Each individual Burgess-Manning Ceiling Panel can be removed for complete access to service lines in space above.



## Description of Burgess-Manning 3-Way Functional Ceiling

Burgess-Manning Ceiling consists of a suspension system to which is attached a water coil by means of Burgess-Manning Coil Spring Clips. This assembly forms a base for the acoustic-thermal blanket and the ceiling surface is in turn snapped on to the coil by Burgess-Manning Panel Spring Clips.

**Suspension System**—consists of standard  $\frac{1}{8}$ " steel wire pencil rod hangers on 4' centers which are attached to standard  $1\frac{1}{2}$ " channels on 4' centers.

**Water Coil**—grid-type coil consists of prefabricated Burgess-Manning Headers to which are welded  $\frac{1}{2}$ " IPS galvanized pipe laterals. Sinuous-type coil consists of prefabricated Burgess-Manning Flat-Back U-Bends to which are welded  $\frac{1}{2}$ " IPS galvanized pipe laterals.

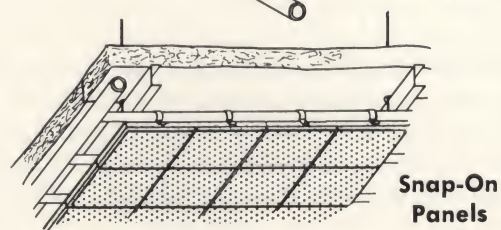
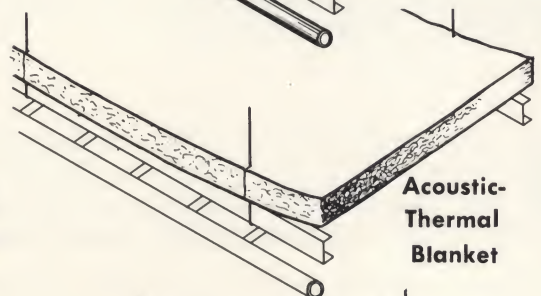
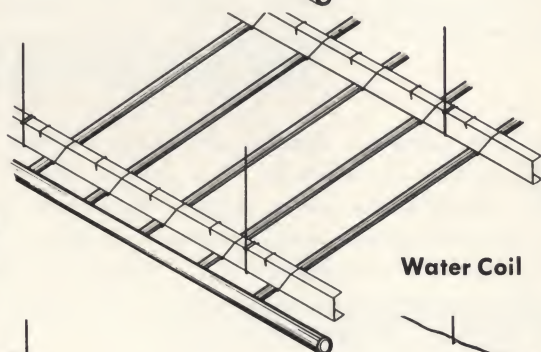
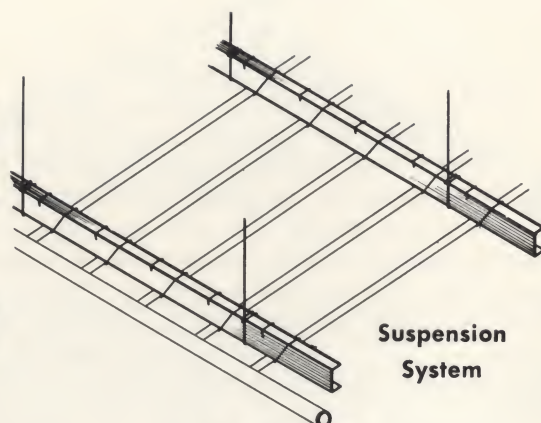
**Acoustic-Thermal Blanket**—consists of a blanket with the desired noise reduction coefficients and thermal properties.

**Snap-On Panels**—consist of prefabricated perforated (1105 holes/sq. ft.— $3/32$ " dia. diagonal pattern—bevels unperforated) aluminum panels with two (2) coats baked-on white enamel finish.

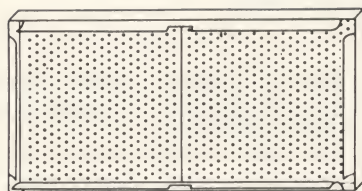
The Headers, Flat-Back U-Bends and Laterals are galvanized for maximum life and insurance against electrolytic action.

Any acoustic-thermal blanket with the desired noise reduction coefficients and thermal properties may be used provided it is not paper wrapped, will not sift down and is suited to the water temperature selected, e.g.

Bonded Glass Fiber Blanket		
Thickness	"K" Value	NRC
1½"	.235	80
2"	.235	85
3"	.235	90



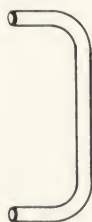
The Snap-On Panels are fabricated from heavy gauge aluminum selected for maximum thermal conductivity and finished in a multi-coat, baked-on enamel for maximum durability. Easily maintained — may be washed or redecorated repeatedly without any effect on either acoustic or thermal characteristics. The finished ceiling presents an attractive, modern, tile-like appearance.



Snap-On Aluminum Panel



Header



Flat-Back U-Bend



Coil Spring Clip



Panel Spring Clip

All components of the Burgess-Manning 3-Way Functional Ceiling are prefabricated and supplied by Burgess-Manning Company with the exception of the suspension system, molding, acoustic-thermal blanket and 1/2" IPS galvanized pipe laterals which are standard on the market and supplied by the contractor.

### Components include:

**Burgess-Manning Snap-On Aluminum Panels**, two (2) coats baked-on white enamel finish.

**Burgess-Manning Headers**, prefabricated 1 1/4" IPS galvanized pipe.

**Burgess-Manning Flat-Back U-Bends**, prefabricated 1 1/8" tubing, hot-dipped galvanized.

**Burgess-Manning Coil Spring Clips**, black oxide finish.

**Burgess-Manning Panel Spring Clips**, black oxide finish.

### TYPICAL SPECIFICATION

Install Burgess-Manning Ceiling complete with suspension system, heating-cooling coils, acoustic-thermal blanket, perforated aluminum Snap-On Panels standard finish and matching metal edge molding. Each coil is to be provided with threaded nipple ready to accept supply and return piping. Openings to be provided for recessed light troffers, diffusers and sprinkler heads. Supply and return piping, including balancing cocks and air vents to be supplied and installed by others.

### SUGGESTED CONTRACT PROCEDURE

Burgess-Manning Ceiling Specifications should be a separate part of the specifications to permit bidding and letting as a unit either independently or as a part of the general or mechanical contract. This procedure has the advantage of a single contractor being responsible for the four (4) trades — lathers, steam fitters, carpenters and sheet metal workers, generally required to install a Burgess-Manning Ceiling.



## Performance Characteristics of Burgess-Manning Ceiling

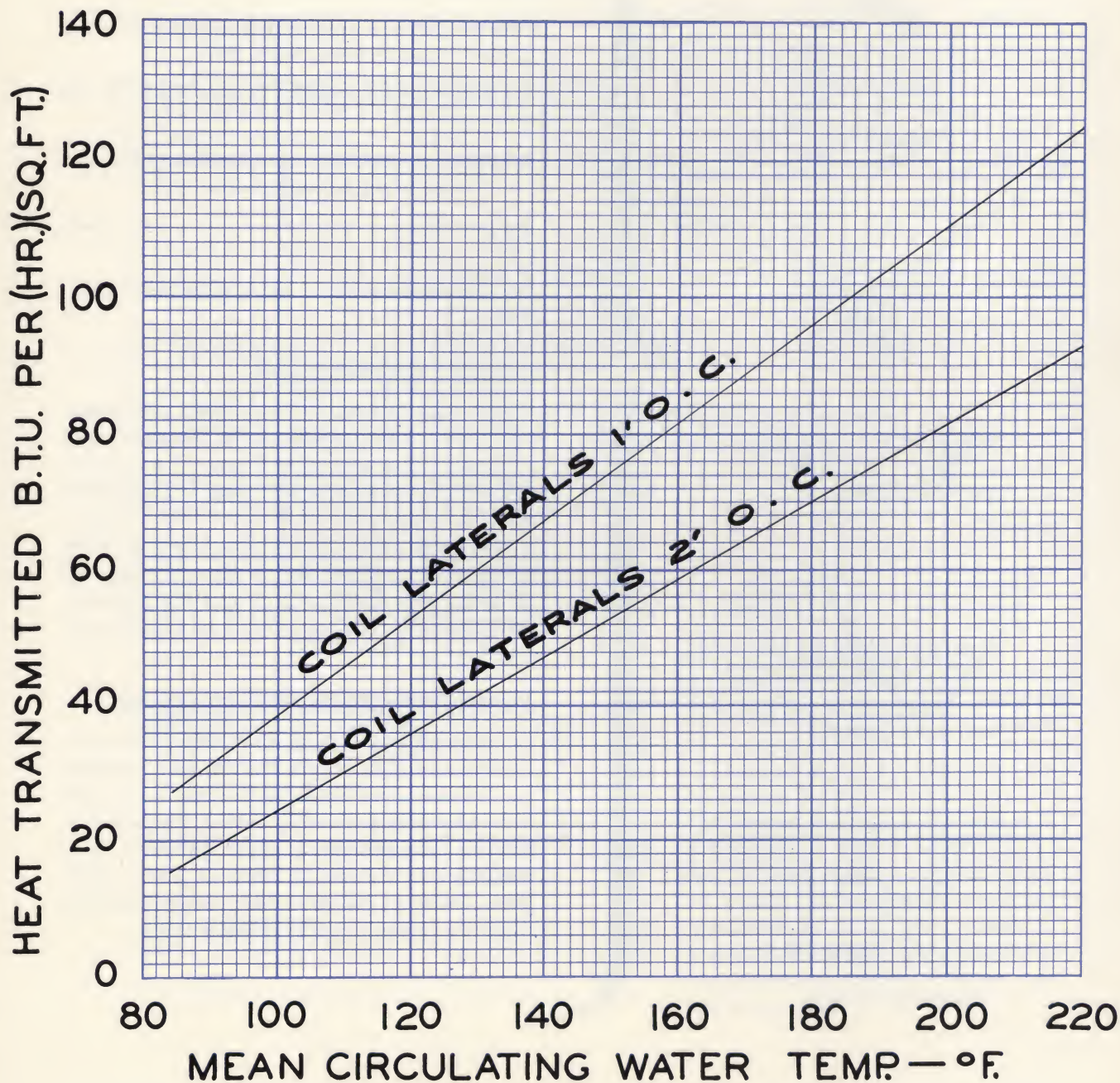
**Specific Curve Conditions: 70°F Air Temperature and 65°F A.U.S.T.  
(Average Unheated Surface Temperature) or U.M.R.T.**

To find total heat transmitted:

Project mean circulating water temperature (abscissa) to selected radiant panel curve. Capacity can then be read from ordinate in B.T.U. per (hour) (square foot) of ceiling area.

Data verified by Armour Research Foundation of Illinois Institute of Technology during analysis and evaluation of Burgess-Manning Ceiling under Research Project No. 3-1146L.

$$\text{Mean Circulating Water Temperature} = \frac{\text{Supply Temp.} + \text{Return Temp.}}{2}$$



A-126—Burgess-Manning Ceiling Heating Capacity Curves



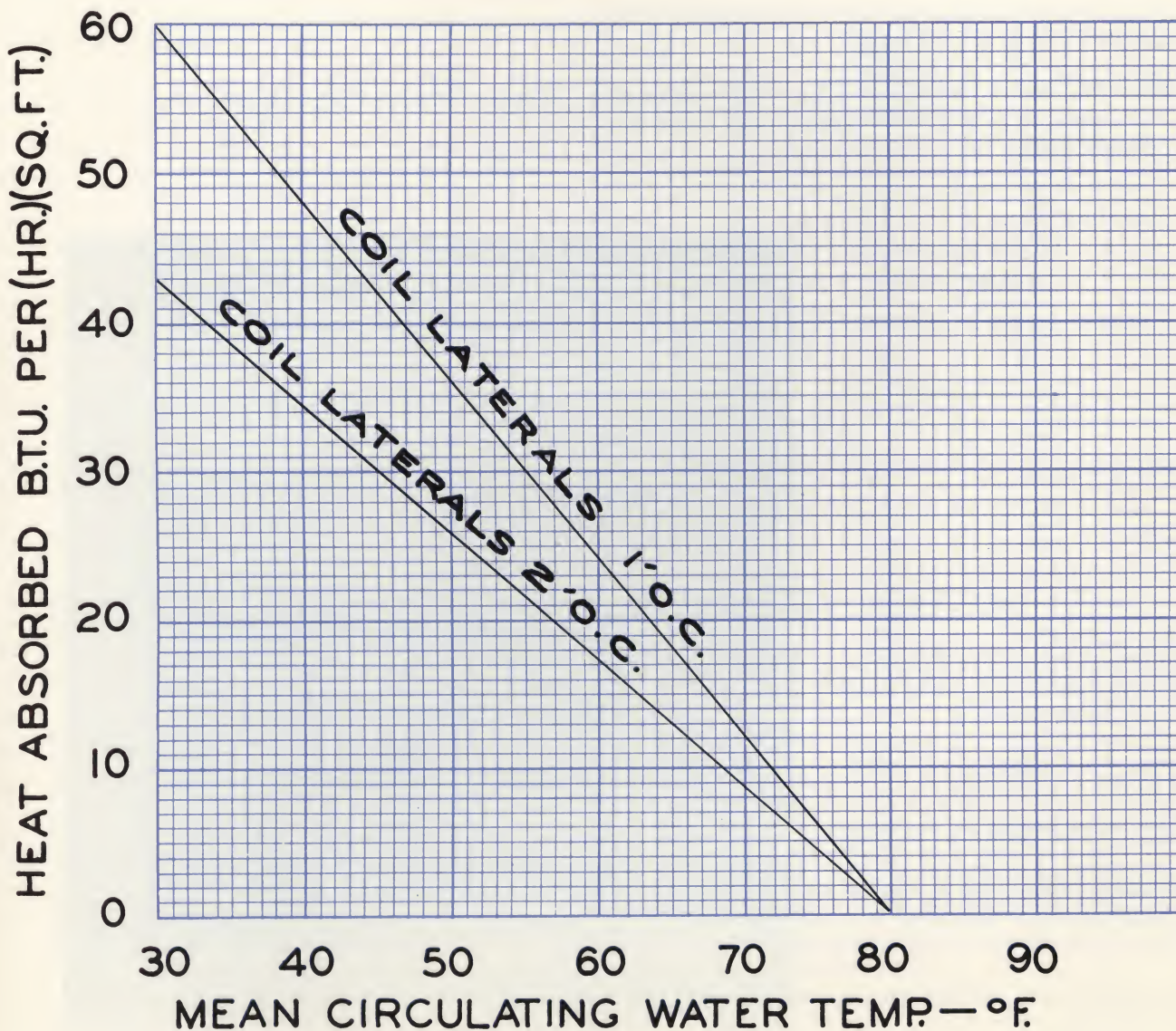
**Specific Curve Conditions: 80°F Air Temperature and 80°F A.U.S.T.  
(Average Uncooled Surface Temperature) or U.M.R.T.**

This curve does not include: Reflected solar radiation or any direct radiation from electric lights and electrical appliances.  
To find minimum sensible heat absorbed by the ceiling.

Project mean circulating water temperature (abscissa) to selected radiant panel curve. Capacity can then be read from ordinate in B.T.U. per (hour) (square foot) of ceiling area.

Data verified by Armour Research Foundation of Illinois Institute of Technology during analysis and evaluation of Burgess-Manning Ceiling under Research Project No. 3-1146L.  
Mean Circulating Water Temperature =  $\frac{\text{Supply Temp.} + \text{Return Temp.}}{2}$

Note: Supply water temperature cannot be lower than dew point temperature.



A-127—Burgess-Manning Ceiling Cooling Capacity Curves

**The following is a suggested procedure for layout of Burgess-Manning Ceiling for heating only.**

- 1** Zone the building or space to be heated and proceed as follows in each zone.
- 2** Determine heat loss for each room to be heated.
- 3** Determine the area (sq. ft.) for each room to be heated.
- 4** Determine panel demand for each room to be heated by dividing the heat loss by the area (sq. ft.).
- 5** Determine mean circulating water temperature, assuming a 20°F temperature drop across each coil, required to satisfy greatest panel demand (laterals 1' o.c.) from Curve A-126.
- 6** Determine ceiling area of either 1' o.c. or 2' o.c. laterals required to satisfy the heat loss, filling in balance of ceiling area, if any, with metal pan acoustic ceiling.

**The following is a suggested procedure for layout of Burgess-Manning Ceiling for cooling only.**

- 1** Zone the building or space to be cooled and proceed as follows in each zone.
- 2** Determine sensible heat gain for each room to be cooled.
- 3** Determine area (sq. ft.) for each room to be cooled.
- 4** Determine dewpoint from psychometric chart based on indoor design conditions. This fixes minimum inlet water temperature.
- 5** Determine absorption rate from Curve A-127 at mean circulating water temperature assuming a 5°F temperature rise across each coil.
- 6** Determine the sensible heat absorbed by multiplying absorption rate by ceiling area.
- 7** If the sensible heat gain exceeds the sensible heat absorbed the difference must be handled by the ventilating system.



## The following is a suggested procedure for layout of Burgess-Manning Ceiling for heating and cooling.

**1** Zone the building or space to be heated and cooled and proceed as follows in each zone.

**2** For maximum radiant cooling, all treated rooms must be covered with coils, laterals 1' o.c.

**3** Determine heat loss for each room to be heated and cooled.

**4** Determine the area (sq. ft.) for each room to be heated and cooled.

**5** Determine panel demand for each room to be heated by dividing the heat loss by the area.

**6** Determine mean circulating water temperature, assuming a 20°F temperature drop across each coil,

required to satisfy greatest panel demand (laterals 1' o.c.) from Curve A-126.

**7** Determine the ceiling area (laterals 1' o.c.) required to satisfy heat loss in all remaining rooms. The remaining ceiling area in each room to be covered by a cooling only coil.

**8** Determine dewpoint from psychometric chart based on indoor design conditions. This fixes minimum inlet water temperature.

**9** Determine absorption rate from Curve A-127 at mean circulating water temperature assuming a 5°F temperature rise across each coil.

**10** Determine sensible heat absorbed by multiplying absorption rate by ceiling area.

**11** If the sensible heat gain exceeds the sensible heat absorbed the difference must be handled by the ventilating system.

### HEATING

ROOM NO.	ROOM AREA	HEAT LOSS	PANEL DEMAND	COIL NO.	EFFECTIVE PANEL AREA	HEAT OUTPUT	MEAN H <sub>2</sub> O TEMP.	TEMP. DROP	G.P.M.	NOTES
	SQ.FT.	B.T.U.H.	B.T.U.		SQ.FT.	B.T.U.H.	°F.	°F.		

### SUGGESTED HEADINGS FOR "HEATING" WORK SHEET

### COOLING

ROOM NO.	ROOM AREA	HEAT GAIN	ABSORPTION RATE	COIL NO.	EFFECTIVE PANEL AREA	HEAT ABSORBED	MEAN H <sub>2</sub> O TEMP.	TEMP. RISE	G.P.M.	NOTES
	SQ.FT.	B.T.U.H.	B.T.U.		SQ.FT.	B.T.U.H.	°F.	°F.		

### SUGGESTED HEADINGS FOR "COOLING" WORK SHEET

The gallons per minute (GPM) water required for each coil is determined by dividing the heat loss by the thermal capacity (Btu/hr.) of water.

$$\text{GPM} = \frac{\text{Heat Loss (Btu/hr.)}}{\text{Temperature Drop (°F)} \times 60 \times \text{wt. of 1 gal. water (lbs.)}}$$

1 ga. water = 8.3 lbs. (approx.)

## CONTROLS

Burgess-Manning 3-Way Functional Ceiling is designed for fully automatic control using standard hot water controls designed for continuous circulation. Either pneumatic, electric or electronic controls may be used.

Zone control, normally water temperature control, can be handled by either of two methods:

**1** A 3-way mixing valve controlled by a modulating

zone room thermostat. The primary water temperature is regulated by an outdoor control.

**2** A convertor with the primary water or steam controlled by a modulating zone room thermostat and the temperature of the secondary water regulated by an outdoor control.

Individual room control within a zone, normally flow control, can be handled by a valve controlled by a modulating room thermostat.



Estimating a Burgess-Manning 3-Way Functional Ceiling is no different from estimating a conventional suspension type ceiling.

A Burgess-Manning Ceiling estimate is broken down into four separate departments, namely:

1. The suspension system—usually installed by the lather.
2. Headers and laterals—usually installed by the steam fitter.
3. Acoustic-thermal blanket—installed by carpenter or sheet metal worker.
4. Snap-On Ceiling panels — installed by either carpenter or sheet metal worker.

Estimating of each department then follows general practice, with such considerations as:

- A. Cost of materials furnished by Burgess-Manning Company, such as:
- Burgess-Manning Snap-On Panels .....(\_\_\_\_sq. ft. @\_\_\_\_)
  - Burgess-Manning Panel Spring Clips.....(No.\_\_\_\_ @\_\_\_\_)
  - Burgess-Manning Coil Spring Clips.....(No.\_\_\_\_ @\_\_\_\_)
  - Burgess-Manning Headers, 1' o.c.....(\_\_\_\_lengths @\_\_\_\_)
  - Burgess-Manning Headers, 2' o.c.....(\_\_\_\_lengths @\_\_\_\_)
  - Burgess-Manning Flat-Back U-Bends, 1' o.c.....(No.\_\_\_\_ @\_\_\_\_)
  - Burgess-Manning Flat-Back U-Bends, 2' o.c.....(No.\_\_\_\_ @\_\_\_\_)

(Current price lists on above furnished on request)

- B. Cost of materials to be supplied by the contractor locally, such as:
- 1½" Iron (\_\_\_\_feet, @\_\_\_\_)
  - Pencil Rod (\_\_\_\_lbs., @\_\_\_\_)
  - Blanket (\_\_\_\_sq. ft., @\_\_\_\_)
  - Molding (\_\_\_\_lin. ft., @\_\_\_\_)
  - ½" IPS galv. pipe (\_\_\_\_lin. ft., @\_\_\_\_)

- C. Cost of labor
- Labor for installing suspension system
  - Labor for installing coils
  - Labor for installing blanket
  - Labor for installing Snap-On Panels
  - Labor for installing molding

- D. Other standard costs, such as:
- Insurance
  - Taxes
  - Cartage
  - Traveling

- E. Overhead

- F. Profit

## Cost

Burgess-Manning 3-Way Functional Ceiling is suited to any structure using suspended ceilings and requiring heating and/or cooling and acoustic control. Burgess-Manning Ceiling can be used advantageously, with few exceptions, in all existing or new office buildings, institutions, or commercial applications.

Burgess-Manning 3-Way Functional Ceiling is competitive in cost with other systems and methods that provide the advantages of suspended ceiling construction, comparable comfort during the heating cycle and equivalent acoustic control. The addition of radiant cooling generally represents a saving over any other comparable method by reducing and simplifying the air handling equipment.

## Remember these important savings

A Burgess-Manning Functional Ceiling—

1. Reduces duct sizes.
2. Reduces air handling equipment.
3. Simplifies ventilating controls.
4. Reduces duct insulation.
5. Eliminates light troffer framing.
6. Eliminates recessing for convectors, baseboard heating, etc.
7. Eliminates need for ceiling painting.
8. Reduces roof insulation requirements.
9. Every panel an access-panel to simplify service line layouts, installation and maintenance.
10. Reduces story height and structural steel requirements.

## A Burgess-Manning Ceiling is:

- A luxury in comfort, convenience, and low maintenance.
- An economy in capital investment, operation and structural benefits.



# WHAT USERS SAY...



## Aluminum Company of America

Pittsburgh 19, Pa.

December 3, 1953

Burgess-Manning Company  
Architectural Products Division  
5970 Northwest Highway  
Chicago 31, Illinois

Attention Mr. D. W. Day

Dear Mr. Day:

Now that the rush and press of detail of completing and occupying our new building is over, it is a pleasure to relax for a moment and reflect upon some of the things we feel the building and its development aspects have accomplished. You and your people would, of course, be primarily interested in our reactions to the Burgess-Manning type radiant heating and cooling ceiling after studying it in conditions of day to day living.

Even before final balancing of the system has been achieved, we feel certain the people in our building are enjoying a year round comfort level that is unsurpassed by any other commercial structure. The quick response to thermostat call, the imperceptibility of change of cycle, the pleasing architectural appearance, the low sound level, all seem to be as interesting to our general employees as they are intriguing to our engineering staff.

This venture into the use of aluminum for radiant heating and cooling we consider as quite successful, and expect it to continue thus. The cooperative effort between Alcoa and Burgess-Manning to apply your development to our building was never other than most pleasant.

We understand you have now accomplished several improvements and refinements over the details employed in the Alcoa Office Building. We are, naturally, interested in keeping abreast of your activities in that regard and sincerely wish your company every success with your product.

Very truly yours,  
ALUMINUM COMPANY OF AMERICA

By O. M. Mader  
O. M. Mader  
Asst. Industry Manager  
Architectural Sales Division

OMM:mk



December 8, 1953

Mr. Parker Thorne  
Airtex Corporation  
333 North Michigan Ave.  
Chicago, Ill.

Dear Mr. Thorne:

The last time you visited us I think you mentioned that our Burgess-Manning Ceiling was the first commercial installation in this country.

Now that we are entering our fifth heating season, I just wanted you to know how much we have enjoyed the comfort provided by the ceiling.

We are still hopeful of using this system in our other offices, and will continue to recommend it to our friends and to our associates in the Mayflower Warehousemen's Association.

Very truly yours,

Forrest Rice

Forrest Rice, Vice-President  
LINCOLN STORAGE & MOVING CO., INC.







*See for yourself...*

For additional information on the comfort conditioning advantages of Burgess-Manning 3-Way Functional Ceiling, write Architectural Products Division, Burgess-Manning Company, or call your nearest sales representative.

We fully realize that the finest and most complete piece of literature we could prepare would still not equal a first-hand inspection of an actual installation. Therefore, the Burgess-Manning 3-Way Functional Ceiling in our own headquarters has been so planned as to permit you to go right up top-side and see-for-yourself. We invite you.

Or, should you prefer to see a large installation, may we suggest The Alcoa Building in Pittsburgh, Pa.

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*Architectural Products Division*

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CHICAGO 31, ILLINOIS



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For additional information on the comfort conditioning advantages of Burgess-Manning 3-Way Functional Ceiling, write Architectural Products Division, Burgess-Manning Company, or call your nearest sales representative.

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Or, should you prefer to see a large installation, may we suggest The Alcoa Building in Pittsburgh, Pa.

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